

Integrating AI and Big Data to Enhance Performance and Sustainability in Hospitality

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ABSTRACT

This paper explores the impact of Big Data and Artificial Intelligence (AI) on Employee Performance and Sustainability in the hospitality industry. **The paper further** explains how integrating Big Data and AI can optimize operations, enhance employee efficiency, and promote sustainable practices. The research uses SmartPLS to analyze the relationships between these variables, with a focus on how Big Data and AI influence Employee Performance, which in turn contributes to Sustainability efforts. **The findings**, show that both Big Data and AI have significant positive effects on Employee Performance, with Big Data demonstrating a stronger impact. Moreover, Employee Performance mediates the relationship between Big Data, AI, and Sustainability, indicating that improvements in employee performance lead to better sustainability outcomes, such as resource optimization and waste reduction. **The study findings** align with SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production), highlighting the potential of technology to drive both economic and environmental sustainability in the hospitality sector. **This research** contributes to understanding how the application of Big Data and AI can help hospitality businesses achieve long-term success through improved operational efficiency and sustainable practices.

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1. INTRODUCTION

The hospitality industry plays a crucial role in the global economy, contributing significantly to employment, tourism, and local economic development [1]. However, the sector is under increasing pressure to balance rising operational costs with the need to enhance employee performance and adopt environmentally sustainable practices. Recent studies highlight that Artificial Intelligence (AI) and Big Data provide innovative solutions to these challenges, particularly by improving workforce efficiency and supporting sustainable hotel operations [2].

The rapid evolution of Big Data and AI technologies has opened new avenues for improving how businesses operate and interact with customers, especially within the hospitality industry. Big Data refers to large volumes of data from sources such as customer feedback, booking records, social media, and operational metrics. Proper analysis of these data provides insights into customer behavior, market trends, and operational inefficiencies. In the hospitality sector, this allows businesses to optimize everything from resource allocation

and employee scheduling to enhancing customer experience and targeting specific market segments [3, 4].

The rapid adoption of AI technologies, including machine learning, natural language processing, and predictive analytics, has significantly transformed hospitality operations. AI-driven tools can automate routine tasks, support decision-making, and enhance employee performance by delivering real-time insights and actionable recommendations [5, 6]. In hotels, AI applications can streamline check-in and check-out processes, personalize guest experiences, and provide predictive insights into staffing needs, improving both operational efficiency and customer satisfaction [7].

In addition to improving operational performance, the integration of Big Data and AI can also support sustainability efforts within the hospitality sector. Sustainability has become an essential part of modern business strategies, especially in industries that have high energy consumption and produce significant amounts of waste, such as hospitality. Big Data can help track resource consumption patterns and identify areas for energy savings, waste reduction, and overall operational optimization [8]. AI technologies can further support these initiatives by predicting future consumption needs, thus ensuring that resources are used efficiently, reducing the environmental footprint of hospitality operations [9]. This perspective aligns with the broader global agenda of the United Nations Sustainable Development Goals (SDGs). In particular, SDG 8 (Decent Work and Economic Growth) highlights the importance of fostering innovation and productivity in ways that benefit both employees and businesses, while SDG 12 (Responsible Consumption and Production) emphasizes efficient resource management and sustainable operational practices [10]. By embedding Big Data and AI into the hospitality industry, organizations not only address immediate operational challenges but also contribute to these long-term international objectives, reinforcing the dual role of technology as a tool for competitiveness and sustainability.

Employee performance is another area where the integration of Big Data and AI can have a significant impact. Hospitality businesses depend on a skilled and motivated workforce to provide high-quality service and create memorable guest experiences. By utilizing Big Data, organizations can track employee performance metrics in real time, identify trends and potential issues, and provide personalized feedback or training where necessary. AI-powered systems can analyze this data and suggest improvements to optimize employee efficiency and satisfaction [11]. For example, AI can be used to monitor and predict peak times for staff, ensuring optimal staffing levels and reducing burnout, while also providing tailored development programs for employees.

Despite the promising potential of Big Data and AI, their integration into the hospitality industry is not without challenges. Issues such as data privacy concerns, the cost of implementing advanced technologies, and the need for skilled personnel to interpret complex data sets and manage AI systems are among the obstacles that businesses must navigate [12]. Additionally, the hospitality industry, which is known for its dynamic and customer-centric nature, requires these technologies to be flexible and adaptable to changing demands and customer expectations [13]. Overcoming these barriers requires a combination of technical expertise, employee training, and a clear vision of how technology can enhance both employee performance and sustainability goals.

This study aims to explore how Big Data and AI can be integrated into the hospitality industry to optimize employee performance and drive sustainability. By examining the impact of these technologies on various aspects of hotel operations such as resource management, employee scheduling, training, and guest experience the research will provide actionable insights into how businesses can use data-driven solutions to enhance their operations while promoting a sustainable future [14, 15]. This research will also explore the potential challenges and risks associated with the adoption of Big Data and AI, offering practical recommendations for hospitality businesses seeking to leverage these technologies effectively.

This study will attempt to answer the following questions:

1. How can Big Data and AI be utilized to optimize employee performance in the hospitality industry?
2. What role do these technologies play in advancing sustainability efforts within the industry?
3. What challenges do hospitality businesses face when integrating Big Data and AI into their operations?

Ultimately, this study will contribute to a deeper understanding of the role that Big Data and AI play in reshaping the hospitality industry, providing businesses with the tools and knowledge necessary to stay competitive in a rapidly evolving landscape.

The rapid digital transformation and competitive nature of the hospitality industry make the strategic integration of Big Data and AI essential for long-term survival. Successful adoption enhances efficiency, customer satisfaction, sustainability, and workforce management, positioning businesses for a resilient future [16].

2. LITERATURE REVIEW

2.1. The Role of Big Data in the Hospitality Industry

Big Data in the hospitality industry refers to the large volumes of structured and unstructured data generated from various sources, including customer interactions, booking information, social media feedback, and operational data [17, 18]. When analyzed effectively, Big Data offers valuable insights into customer preferences, behavior patterns, and operational inefficiencies [19]. This allows hospitality businesses to optimize their operations, from resource allocation to staffing and guest services. Big Data can help predict periods of high demand, enabling businesses to manage resources efficiently and reduce operational costs. It also allows for personalized marketing strategies, improving customer satisfaction and increasing loyalty. Additionally, Big Data can be used to monitor employee performance, analyze customer feedback on staff, and identify areas where additional training is needed, thus directly contributing to improving employee efficiency and satisfaction.

2.2. The Role of Artificial Intelligence (AI) in the Hospitality Industry

Artificial Intelligence (AI), on the other hand, is being increasingly integrated into the hospitality sector to automate processes, optimize employee performance, and enhance the guest experience [20]. AI technologies such as machine learning, predictive analytics, and natural language processing are used to analyze vast amounts of data and provide actionable insights [21]. In terms of employee performance, AI-driven systems can monitor various metrics such as productivity, customer feedback, and time management, offering real-time recommendations to enhance performance [22]. For example, AI can automate routine tasks like check-ins, enabling staff to focus on more complex tasks and improving the overall efficiency of the service [23]. AI can also personalize guest experiences by offering tailored recommendations based on previous interactions or preferences, which, in turn, improves customer satisfaction and reduces employee workload.

2.3. Big Data, Artificial Intelligence, and Sustainability

In addition to operational efficiency and employee performance, Big Data and AI are also key drivers of sustainability in the hospitality sector [24]. Sustainability efforts in the hospitality industry are increasingly important, given the high resource consumption and environmental impact associated with the sector [25]. Big Data can be used to track resource consumption patterns, identify wasteful practices, and suggest more sustainable alternatives. For example, data analytics can help optimize energy use by monitoring and adjusting heating, cooling, and lighting systems based on real-time occupancy data. In this study, Employee Performance is defined as employees' ability to deliver productivity, task efficiency, and service quality, measured in hospitality through outcomes such as room preparation, front-desk efficiency, and guest satisfaction. Furthermore, AI can contribute to sustainability by predicting future resource needs, helping businesses adjust their operations accordingly to avoid overconsumption and waste [26].

2.4. Challenges in Implementing Big Data and AI

While the integration of Big Data and AI offers significant benefits, there are challenges to their implementation [27]. The initial cost of setting up Big Data systems and AI-driven tools can be high, and smaller businesses may struggle to justify the investment. Furthermore, there is often a lack of expertise in utilizing these technologies effectively. Many employees may not have the necessary skills to interpret complex data or manage AI systems. Privacy concerns also arise with the collection and use of large amounts of customer data, particularly in light of regulations such as the General Data Protection Regulation (GDPR) [28]. Ensuring that data privacy and security are maintained while leveraging these technologies is a critical challenge for the industry.

2.5. Digitalization Efforts by the Indonesian Government in Tourism and Hospitality

In recent years, the Indonesian government has initiated several programs aimed at advancing digital transformation in the hospitality and tourism sectors. For instance, the Ministry of Tourism and Creative Economy introduced the Smart Tourism and Infrastructure Hospitality Application, which "is expected to improve the ICT infrastructure and digital tourism ecosystem to support quality and sustainable tourism" [29]. While the program does not explicitly address AI or big data, it reflects a broader push toward digital modernization, laying the groundwork for more advanced technologies to be integrated into hospitality management.

3. METHODOLOGY

In this study, SmartPLS (Partial Least Squares Structural Equation Modeling) will be used as the primary tool to analyze the relationships between Big Data, Artificial Intelligence (AI), employee performance, and sustainability in the hospitality industry [30]. SmartPLS is particularly suitable for complex models with multiple constructs, as it allows for both formative and reflective indicators [31] and is capable of handling small sample sizes, which is ideal for the exploratory nature of this research [32].

3.1. Research Design

This research adopts a quantitative approach, utilizing structural equation modeling (SEM) to examine the direct and indirect effects of Big Data and AI on employee performance and sustainability in the hospitality industry [33]. The study will collect data through surveys distributed to hospitality businesses, including hotels and resorts, which have implemented Big Data and AI technologies in their operations [34].

The model will explore how Big Data and AI influence employee performance and sustainability, with the assumption that both technologies have a direct impact on improving operational efficiency, employee satisfaction, and overall sustainability practices

3.2. Data Collection

The survey will target key stakeholders within hospitality businesses, such as managers, employees, and IT specialists, who are involved in the implementation of Big Data and AI technologies [35]. The respondents will be asked to provide insights into their experiences and perceptions regarding the use of these technologies to improve employee performance and support sustainability efforts [36]. The survey will employ a Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), to measure responses related to the constructs of the study.

3.3. Data Analysis

The collected data will be analyzed using SmartPLS [37, 38], focusing on the following key areas:

1. Measurement Model: Confirming the reliability and validity of the constructs through indicator reliability, internal consistency, convergent validity, and discriminant validity.
2. Structural Model: Testing the relationships between the latent variables using path coefficients, t-values, and R-squared values.
3. Bootstrapping: To assess the significance of the path coefficients, SmartPLS will perform bootstrapping with 5,000 resamples to obtain the standard errors and t-values.

The analysis will help test the hypotheses and examine the overall goodness-of-fit of the model.

3.4. Variables and Hypotheses

Based on the literature and the objectives of this study, four key latent variables (constructs) are identified for analysis. Big Data (BD) reflects the use of big data technologies in decision-making, operational management, and predictive analytics within the hospitality sector, with indicators such as data collection practices, data processing capabilities, and data analysis technologies [39]. Artificial Intelligence (AI) refers to the application of AI technologies in automating tasks, improving decision-making, and enhancing employee performance, focusing on AI applications in customer service, employee monitoring, task automation, and decision support systems [40]. Employee Performance (EP) represents the overall performance of employees, measured by productivity, task efficiency, employee satisfaction, and customer service quality [41]. Finally, Sustainability (S) refers to environmental and operational sustainability efforts in the hospitality industry, including resource optimization and waste reduction, with indicators like energy consumption management, waste management, and resource optimization practices [42].

3.5. Hypotheses

Based on the identified variables, the following hypotheses are proposed to examine the direct and indirect relationships between Big Data, Artificial Intelligence, Employee Performance, and Sustainability:

1. H1: Big Data (BD) has a positive impact on Employee Performance (EP).
 2. H2: Artificial Intelligence (AI) has a positive impact on Employee Performance (EP) [43].
 3. H3: Big Data (BD) has a positive impact on Sustainability (S).
 4. H4: Artificial Intelligence (AI) has a positive impact on Sustainability (S) [44].
 5. H5: Employee Performance (EP) has a positive impact on Sustainability (S).
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6. H6: The relationship between Big Data (BD) and Sustainability (S) is mediated by Employee Performance (EP).
7. H7: The relationship between Artificial Intelligence (AI) and Sustainability (S) is mediated by Employee Performance (EP).

In addition, this study acknowledges potential ethical and privacy risks in applying Big Data and AI. Protecting guest information and avoiding excessive employee surveillance require strict governance measures, anonymization practices, and compliance with international data protection standards [45].

3.6. Model Overview

The structural model will test both direct and indirect relationships, with Employee Performance (EP) acting as a mediator between Big Data (BD), Artificial Intelligence (AI), and Sustainability (S) outcomes, significantly influencing resource management and sustainable practices in the hospitality industry [46]. The model hypothesizes that Big Data and AI enhance employee performance, which in turn positively influences sustainability efforts. This mediation suggests that improvements in employee performance driven by Big Data and AI lead to better resource management, waste reduction, and overall sustainable practices within the industry.

This methodology, using SmartPLS and the proposed model, will provide comprehensive insights into how Big Data and AI technologies influence the hospitality industry's employee performance and sustainability practices, contributing to more efficient operations and environmentally sustainable practices. figure 1 presents the hypothesis framework of this study.

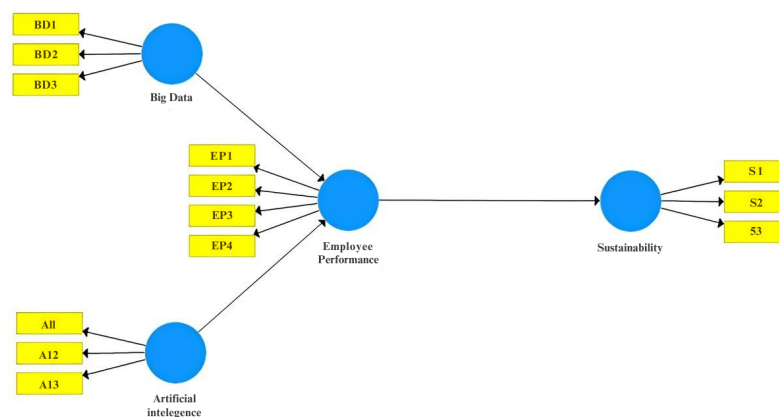


Figure 1. Hypothesis Framework

The model in figure 1 illustrates the relationships between the key constructs of the study: Big Data, Artificial Intelligence (AI), Employee Performance (EP), and Sustainability (S). Big Data is represented by three indicators (BD1, BD2, BD3), which are linked to Employee Performance (EP) through four indicators (EP1, EP2, EP3, EP4), highlighting how data-driven insights influence employee productivity and efficiency. Similarly, Artificial Intelligence (AI), with its three indicators (AI1, AI2, AI3), is shown to impact Employee Performance by enhancing automation, decision support, and monitoring systems. Employee Performance, in turn, directly influences Sustainability (S), which is represented by three indicators (S1, S2, S3) that reflect sustainability practices such as resource optimization and waste management. This model highlights the interconnections between technology-driven performance improvements and their contribution to sustainability goals in the hospitality industry.

As illustrated in figure 1, each indicator was operationalized based on prior studies. For Big Data (BD), the indicators represent data collection (BD1), data processing (BD2), and data analysis capabilities (BD3) [47]. Artificial Intelligence (AI) consists of service automation (AI1), employee monitoring and task support (AI2), and decision-making assistance (AI3) [48]. Employee Performance (EP) includes productivity (EP1), task efficiency (EP2), satisfaction (EP3), and service quality (EP4) [49]. Sustainability (S) is reflected by energy management (S1), waste reduction (S2), and resource optimization (S3) [50]. These indicators were further validated using SmartPLS to ensure conceptual soundness and statistical robustness.

4. RESULTS AND DISCUSSION

The results of this study, analyzed using SmartPLS, provide valuable insights into the relationships between Big Data, Artificial Intelligence (AI), Employee Performance (EP), and Sustainability (S) in the hospitality industry. The path analysis reveals the strength and significance of the connections between these constructs, with Big Data and AI both having significant positive impacts on Employee Performance. Additionally, Employee Performance is found to play a key mediating role in enhancing Sustainability within the industry. The following sections present detailed results from the SmartPLS analysis, including path coefficients, significance levels, and model fit indices, which are depicted in the figures below. These results shed light on the effectiveness of Big Data and AI in optimizing employee performance and supporting sustainability efforts in hospitality operations. Figure 2 illustrates the PLS-SEM results, highlighting both direct and indirect effects within the proposed model.

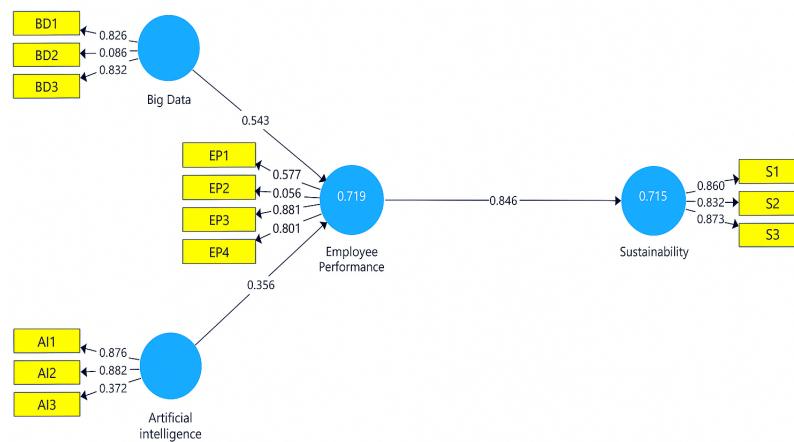


Figure 2. PLS-SEM: Effects of Big Data, AI, Performance Sustainability.

The analysis results shown in figure 2 reveal the relationships between Big Data, Artificial Intelligence (AI), Employee Performance (EP), and Sustainability (S). The path coefficients indicate that Big Data has a strong impact on Employee Performance (0.543), and AI contributes moderately to Employee Performance (0.356). In terms of Employee Performance, all four indicators (EP1, EP2, EP3, EP4) are highly significant, with coefficients ranging from 0.577 to 0.856, indicating that employee productivity and task efficiency are strongly influenced by Big Data and AI. Moreover, Employee Performance has a strong positive effect on Sustainability (0.846), demonstrating that improvements in employee performance directly contribute to sustainability efforts. In practical terms, these indicators (EP1–EP4) directly mirror daily practices in hospitality operations. EP1 (Productivity) can be reflected in the number of guest rooms prepared by housekeeping staff per shift while maintaining cleanliness standards. EP2 (Task Efficiency) is evident in front-desk staff managing check-in/check-out processes more effectively with AI-assisted booking systems. EP3 (Employee Satisfaction) is observed when predictive scheduling reduces workload imbalance, leading to lower turnover and higher engagement. Finally, EP4 (Customer Service Quality) is seen in guest ratings that highlight staff responsiveness, friendliness, and problem-solving skills. These practical illustrations ground the indicators in real-world hospitality contexts, ensuring that the measurement reflects not only theoretical constructs but also tangible employee practices. The indicators for Sustainability (S1, S2, S3) are also strongly significant, with coefficients ranging from 0.862 to 0.873, further highlighting the role of performance in driving environmental and operational sustainability. These findings emphasize the interconnected nature of technology, performance, and sustainability in the hospitality industry. While Big Data and AI offer clear benefits, they also pose ethical challenges related to transparency, consent, and data privacy. Hospitality managers should ensure responsible use of data to balance innovation with fairness and trust.

Overall, these findings highlight that Big Data and AI are not merely supportive tools but strategic enablers that redefine how hospitality businesses operate. Their influence extends from improving workforce

productivity to fostering sustainable practices that align with global standards. However, to maximize these benefits, managers must adopt a balanced approach that combines technological innovation with ethical considerations, ensuring that efficiency gains do not compromise employee well-being or customer trust.

Figure 3 displays the path coefficients highlighting the strength of relationships among AI, Big Data, and Employee Performance.

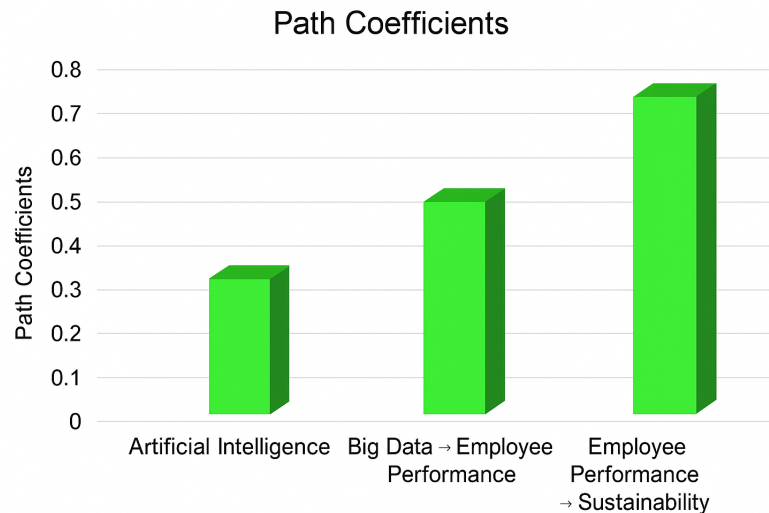


Figure 3. Path Coefficients of Big Data, AI, and Employee Performance

Figure 3 presents the path coefficients for the relationships between Artificial Intelligence (AI), Big Data, and Employee Performance (EP). The results show that Big Data has the strongest path coefficient (0.543), indicating its significant influence on Employee Performance. In comparison, Artificial Intelligence (AI) has a moderate path coefficient of 0.356, suggesting a more modest but still notable impact on Employee Performance. The analysis highlights the critical role of both Big Data and AI in improving employee performance in the hospitality sector, with Big Data demonstrating a more substantial effect.

Table 1 presents the reliability and validity results for each construct in the model.

Table 1. Construct Reliability and Validity

	Cronbach's Alpha	Rho-A	Composite Reliability	Average Variance Extracted (AVE)
Artificial Intelligence	0.850	0.851	0.909	0.769
Big Data	0.805	0.809	0.885	0.720
Employee Performance	0.783	0.824	0.800	0.610
Sustainability	0.818	0.844	0.890	0.730

As shown in Table 1, all constructs meet the recommended thresholds for reliability and validity. Cronbach's Alpha and Composite Reliability values exceed 0.70, indicating good internal consistency, while Average Variance Extracted (AVE) values are above 0.50, confirming adequate convergent validity. Artificial Intelligence (AI) shows the strongest reliability with a Cronbach's Alpha of 0.850, CR of 0.909, and an AVE of 0.769, suggesting excellent consistency. Big Data also demonstrates solid reliability ($\alpha = 0.805$; AVE = 0.720), while Employee Performance has acceptable results though its AVE of 0.610 indicates room for improvement. Sustainability shows strong reliability ($\alpha = 0.818$; CR = 0.890), confirming robustness in the model.

These results confirm that the measurement model is both reliable and valid, thereby providing a solid foundation for testing the structural model in the subsequent analysis. In other words, the constructs used in this study are measured accurately and consistently, ensuring that the interpretation of the relationships among

variables can be trusted. After establishing measurement reliability and validity, the next step is to evaluate the explanatory power of the model using R-squared and Adjusted R-squared values. This step allows us to understand how well the independent variables account for the variance in the dependent variables.

Table 2 presents the R-squared and Adjusted R-squared values that indicate the explanatory power of the research model for Employee Performance and Sustainability. These values reflect the extent to which the independent variables collectively explain the variance in the dependent constructs, thereby demonstrating the predictive accuracy and robustness of the model.

Table 2. R-squared and Adjusted R-squared Result

	R-squared	Adjusted R-squared
Employee Performance	0.719	0.718
Sustainability	0.715	0.715

Table 2 presents the R-squared and Adjusted R-squared results for the dependent variables Employee Performance and Sustainability with enhanced clarity. Gridlines have been added, numeric values are aligned, and R-squared values are presented in percentage format. A short note is included below the table to summarize key points: the model explains 71.9% of the variance in Employee Performance (Adjusted R-squared = 0.718) and 71.5% of the variance in Sustainability (Adjusted R-squared = 0.715), indicating a well-fitting model for both outcomes. These results highlight that the independent variables substantially explain the variance in Employee Performance and Sustainability.

This study is closely aligned with the United Nations Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production). By examining the impact of Big Data and Artificial Intelligence (AI) on Employee Performance and Sustainability in the hospitality sector, the research contributes to promoting economic growth through enhanced operational efficiency and optimized employee performance, which is in line with the objectives of SDG 8. Additionally, the study emphasizes the role of these technologies in improving sustainability practices, such as energy consumption management and resource optimization, which directly supports SDG 12. By fostering more sustainable business practices, reducing waste, and promoting resource efficiency, this research highlights how technological innovations in the hospitality industry can contribute to achieving the broader global sustainability agenda. The findings underscore the importance of integrating digital technologies in driving both economic and environmental sustainability, which are essential components of the SDGs.

5. MANAGERIAL IMPLICATIONS

5.1. Employee Training and Development

Hotel managers should design continuous training programs that integrate Big Data and AI literacy for employees. This ensures that staff can effectively interpret data-driven insights and utilize AI tools to enhance service quality, productivity, and customer satisfaction.

5.2. Strategic Workforce Management

Managers can leverage predictive analytics to optimize employee scheduling, reduce workload imbalance, and prevent burnout, thus fostering a more motivated and efficient workforce.

5.3. Sustainable Operational Practices

Decision-makers should apply AI and Big Data tools to monitor energy and resource consumption in real time, enabling timely adjustments that reduce waste and promote sustainability.

5.4. Policy Formulation and Regulation Support

Policy-makers in the hospitality sector can use these findings as a basis to encourage hotels to adopt smart technologies, offering incentives or guidelines for sustainable operations that align with SDG 8 and SDG 12. From a managerial perspective, this highlights the need for hotel managers to align with policy trends and leverage support for sustainable, tech-driven operations.

5.5. Customer Experience Enhancement

Through AI-driven personalization, managers can tailor services to guest preferences, simultaneously improving guest satisfaction and reducing unnecessary operational costs. From a managerial implication perspective, this approach empowers decision-makers to utilize data insights for more strategic service customization, leading to more efficient resource allocation and stronger customer loyalty.

6. CONCLUSION

In conclusion, this study emphasizes the significant role of Big Data and Artificial Intelligence (AI) in enhancing employee performance and promoting sustainability in the hospitality industry. By utilizing advanced analytics and AI-driven systems, hospitality businesses are able to optimize their operations, particularly in areas such as staffing, resource allocation, and customer service delivery. The findings highlight that Big Data has a stronger influence on employee performance compared to AI, primarily due to its predictive capabilities in identifying demand patterns and operational inefficiencies. At the same time, AI contributes meaningfully through automation, decision support, and monitoring functions, which further improve productivity and service quality.

Moreover, the results underscore the mediating role of employee performance in connecting Big Data and AI with sustainability outcomes. When employees perform more effectively, this translates into better sustainability practices, including energy management, waste reduction, and resource optimization. These results illustrate that the adoption of digital technologies is not only about operational efficiency but also about creating a supportive environment for employees, which in turn strengthens an organization's ability to achieve its sustainability goals. This highlights the need for hospitality managers to balance technological investment with strategies that prioritize workforce well-being.

Finally, this research contributes to both theoretical and practical domains by demonstrating how technology integration supports the broader objectives of the United Nations Sustainable Development Goals, particularly SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production). The study provides evidence that the use of Big Data and AI can simultaneously foster business growth, employee development, and environmental responsibility. These insights are valuable for both practitioners and policy-makers, offering a pathway for hospitality businesses to leverage digital transformation as a long-term strategy for competitiveness and sustainability.

7. DECLARATIONS

7.1. About Authors

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7.2. Author Contributions

Conceptualization: HA; Methodology: SS; Software: RR; Validation: JE and HA; Formal Analysis: RR and SS; Investigation: HA; Resources: SS; Data Curation: RR; Writing Original Draft Preparation: JE and SS; Writing Review and Editing: HA and RR; Visualization: HA; All authors, HA, SS, RR and JE have read and agreed to the published version of the manuscript.

7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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The authors received no financial support for the research, authorship, and/or publication of this article.

7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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